



O'BRIEN & GERE

September 16, 1987

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ENVIRONMENTAL
CONTROL

Mr. Stephen W. Holt
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EPA Region 5 Records Ctr.



257762

Re: NL Granite City RI/FS

File: 2844.012

Dear Steve:

Pursuant to your recent request, we are providing you with our review of data generated during the initial phase of the Remedial Investigation (RI) at the NL Granite City Site in Granite City, Illinois. The review addresses the IEPA's comments transmitted to you by Mr. Ken Miller on July 22, 1987 and comments received by you from Mr. Jay Thakkar (USEPA) during recent telephone conversations. The review is intended to aid you in your review of the data relative to QA/QC issues.

The data reviewed include the slag pile, soils, and first round ground water analytical results.

The Quality Assurance Project Plan (QAPP) for the Granite City RI/FS included quality assurance objectives for measurement data in terms of precision, accuracy and completeness for the various matrices analyzed. In addition, quality control objectives were intended to be consistent with those established for the USEPA's Contract Laboratory Program (CLP) for inorganics. The data have been reviewed in accordance with the QA/QC objectives set forth in the QAPP.

In addition, the data have been reviewed relative to the overall objectives of the project, which were matrix specific. The analytical results for the slag pile and soil samples were for characterization purposes as there are neither state nor federal standards for slag or soils. The data generated for the slag pile were intended to determine whether the materials in the pile are hazardous or non-hazardous, if the constituents are mobile (soluble), and if metal concentrations are sufficient to warrant recycling of the materials. In other words, the data for the slag pile were intended to be used to evaluate management alternatives for the slag pile. Management of the pile is intimately related to the lead concentration in the pile, since lead would be expected to be the metal of highest concentration. The other data are used primarily to characterize the constituents of the pile. The surface

soil samples were collected and analyzed to estimate public health and environmental concerns related to lead exposure. Ground water samples were analyzed to determine the extent of ground water contamination in the vicinity of the site. The ground water in this area does not serve as a source of drinking water. The data have also been reviewed relative to the overall project objectives to determine the usability of the data.

The review of data indicated that QA/QC objectives specified in the QAPP were generally met. Those instances where they were not met are discussed below. Subsequent review of the data relative to the overall objectives of the project indicated that all of the data are usable in that they are of sufficient quality to be used in their intended function.

It should be noted that some data inadvertently included in the QA/QC documentation was not a part of this project. Accordingly, IEPA comments regarding the May 1987 data are not addressed because they are not applicable to this project. Only the samples analyzed in March and April 1987 were for the Granite City RI/FS.

Slag Pile and Soils Analyses

A total of 29 samples from the slag pile were analyzed for 14 parameters for a total of 406 individual analyses. Eighty-five soil samples were analyzed for lead. The review of the data for the slag pile and soil samples indicated that for the most part the QA/QC objectives as defined in the QAPP were attained. The following is a narrative of the specific instances where the QA/QC analyses were not in compliance with the QA/QC objectives. All of the data, however, are usable relative to the overall objectives of the project. Again, please note that the slag and soil samples were analyzed for characterization purposes and that no state or federal standards exist for these materials.

1. The initial calibration verification (ICV) for mercury analyzed on March 13, 1987 was 78%, which is less than the lower acceptance limit of 90%. The ICV concentration was close to the lower sensitivity of the procedure, where precision is highly variable. The other concentrations on the calibration curves were all within the acceptance range. The raw data from the mercury injection logbook indicate that mercury was detected, but at concentrations near or below the instrument detection limit of 0.5 ppb. In terms of the overall project objectives for the slag pile, the data are usable. Adjustments to the data to correct for the ICV do not significantly change the results.
2. The continuous calibration verification (CCV) for mercury on March 13, 1987, at 130%, was above the upper acceptance limit of 110%. The CCV concentration here was also close to the lower sensitivity of the procedure, where precision is in question.

However, the data reported after this CCV was analyzed, with one exception, were all below the instrument's detection limit. Accordingly, the data are usable.

3. The CCV for selenium on March 23, 1987 and April 24, 1987 were below the lower acceptance limit of 90%. The CCV's on March 23, 1987 were 82.5% and 64%. The analytical data associated with the CCV's were all less than the detection limit of the instrument. Adjusting the data for the low CCV's does not change the data relative to the project's objectives and the data are usable. The CCV for selenium on April 24, 1987 was 71%. In this case, the CCV concentration was less than the instrument detection limit. All reported data associated with the CCV had concentrations less than the detection limit. Adjustments of the data do not change the results relative to the overall project objectives. These data are usable.
4. The spike recovery for copper on March 18, 1987 was 42%, compared to the range of $100\% \pm 25\%$ specified by the QAPP. Spikes are used to determine the accuracy of the analytical method. The nature of the material making up the slag pile is such that one could not expect the analytical results to be highly accurate. The results are usable since they are intended to be used in characterizing the slag pile materials.
5. The spike recoveries for zinc analyzed on April 6, 1987 were 2.2% and 140%, which are outside the range specified in the QAPP of $100\% \pm 25\%$. These recoveries reflect the variability of the slag pile material. All other QC data are within the specified guidelines. The data are usable in that they are intended to be used for characterization purposes only.
6. The spike recovery for selenium on March 23, 1987 was 0%. There were matrix problems with the spike sample. The other QC samples analyzed along with the spike met or were just outside of the QAPP requirements. Since the data are intended for characterization purposes, the data are usable.
7. The spike recovery for selenium in the EP Toxicity sample on April 24, 1987 was 71%, which is just outside of the range specified in the QAPP. The EP Toxic concentration for selenium is 1 mg/l. The analytical results indicate the selenium concentration in the extract was less than the detection limit of 0.02 mg/l. Adjusting these data based on the spike recovery results in the same conclusion, that the samples did not exhibit the hazardous characteristic of EP Toxicity based on selenium.

8. The spike recovery for selenium in the slag sample analyzed on April 24, 1987 was 48%. As indicated in Item 6 above, matrix effects were a primary concern in the spike recovery for selenium. The data are usable based on the overall objective to use the data for characterization purposes.
9. The spike recovery for barium on April 13, 1987 was 48%. The other QC data associated with this spike sample met the requirements of the QAPP. Once again, the accuracy of the analysis is impacted by the matrix. The data are usable for characterization purposes.
10. No spike sample for antimony in slag was analyzed since the analytical results indicated the antimony concentration was four times greater than the spiking level. This being the case, the sample should have been analyzed in duplicate and the relative percent difference (RPD) reported. The EPA known and ICV analyses met the requirements of the QAPP, and the CCV was just outside the range specified by CLP. The data are usable for characterization purposes.
11. The duplicate samples for copper on March 18, 1987 had a RPD of 35% which is not within the acceptance limits. The data are usable for characterization purposes.
12. The laboratory control sample (LCS) for barium on April 13, 1987 was 130% which is out of the acceptable range of $100\% \pm 10\%$. The LCS concentration was close to the detection limit where precision is poor. The elevated LCS concentration observed would imply that the analytical results were also elevated. As the absolute concentration of barium in the slag samples is not critical to the objectives of the data, the data are usable.
13. The LCS for selenium on April 24, 1987 was 70.8%. The samples associated with this LCS were slag samples analyzed for EP Toxicity. The observed sample results were all less than the detection limit of 0.02 mg/l. Adjusting the sample results due to the depressed LCS result does not change the conclusion that the samples do not exhibit EP Toxicity for selenium.

To summarize the QA/QC review of the slag and soil analyzes, although not all the QA/QC objectives were met, all the data are usable in terms of the overall objectives of the project.

Ground Water Analysis

Twelve ground water samples were analyzed for 16 parameters and three additional samples were analyzed for total lead, resulting in a total of 195 analyses. The review of the QA/QC analyses for the ground water samples indicated that the QA/QC objectives were met in most cases.

In those cases where certain QA/QC objectives were not attained, the corresponding sample results were determined to be usable relative to the overall objectives of the project. Those specific instances where discrepancies in the QA/QC samples were identified are discussed below:

1. The CCV for antimony analyzed on March 2, 1987 was 87.5% which is just outside the CLP acceptance range of $100\% \pm 10\%$. All the sample results associated with this CCV were less than the detection limit of 20 ppb. The data are usable.
2. The ICV for arsenic analyzed on February 23, 1987 was below the acceptance range. The ICV was 86.5% which is just below the lower acceptable limit of 90%. All but one of the samples associated with this ICV were at or below the detection limit of 5 ppb. The sample that was above the detection limit had a concentration of 11 ppb. The applicable standard for arsenic (State of Illinois Public and Food Processing Water Supply Standards) is 50 ppb. Adjusting the data to reflect the low ICV does not change the conclusions based on the applicable standard. Accordingly, the data associated with this ICV are usable.
3. The CCV for arsenic analyzed on March 23, 1987 was 86%, just below the lower acceptance limit of 90%. The CCV was 86%. The discussion presented in item 2 above holds true for this case. The data associated with this CCV are usable.
4. The CCV for arsenic analyzed on February 24, 1987 was 121%, which is above the upper acceptance limit of 110%. Three of the four samples associated with the CCV were below or just above the detection limit, whereas the other was above the detection limit and above the applicable standard for arsenic of 50 ppb. Adjusting the sample results for the elevated CCV does not change the conclusions relative to the applicable standard. The two samples that are below the detection limit remain below the detection limit. The sample that is just above the detection limit remains just above the detection limit. The sample whose concentration was above the applicable standard remains above the standard. The data associated with this CCV are usable.
5. The CCV for cadmium analyzed on March 5, 1987 was 80.7%, which is below the lower acceptance limit of 90%. All of the sample results associated with this CCV were at, below, or just above the detection limit which was 1 ppb. The applicable standard for cadmium (State of Illinois Public and Food Processing Water Supply Standards) is 10 ppb. Adjusting the data for the CCV results in all data still being below the applicable standard and does not change the conclusions relative to the applicable standard. The sample results associated with the CCV are usable.

6. The CCV's for chromium analyzed on March 4, 1987 were below the lower acceptance limit of 90%. The CCV's were 78.5% and 84.5%. The sample results for chromium were all less than the detection limit of 5 ppb. The applicable standard for chromium (State of Illinois Public and Food Processing Water Supply Standards) is 50 ppb. The conclusions do not change relative to the detection limit and applicable standard when adjusted for the CCV's. The sample results associated with the CCV's are usable.
7. The CCV's for copper analyzed on March 4, 1987 were 125% and 122%, which were above the upper acceptance limit of 110%. All the sample results for copper were below the detection limit of 10 ppb, with one exception. One sample was analyzed at 20 ppb copper, which is the applicable standard (State of Illinois General use Water Quality Standards) for copper. Adjustment of the data based on the elevated CCV's would not affect the less than detectable results. The sample result which was at the applicable standard would be less than the standard if adjusted for the CCV. The conclusions do not change since all samples meet the water quality standard for copper. The sample results are usable.
8. The CCV for lead analyzed on February 27, 1987 was above the upper acceptance limit of 110%. The CCV was 128%. Three samples for the NL Granite City project were associated with this CCV. One result was below the detection limit of 5 ppb, one was at the detection limit, and one was just above the detection limit (6 ppb). The applicable water quality standard for lead is 50 ppb (State of Illinois Public and Food Processing Water Supply Standards). Adjusting the sample results based on the elevated CCV would result in all three being below the detection limit. The adjustment would not affect the conclusions relative to the applicable water quality standard. These data are usable.
9. The CCV's for nickel analyzed on March 4, 1987 were 70.8% and 75.6%, which were below the lower acceptance level of 90%. Ten of the twelve samples analyzed were below the detection limit of 10 ppb. The two results above the detection limit were 20 ppb and 50 ppb. The applicable standard for nickel is 1,000 ppb (State of Illinois General Use Water Quality Standards). Adjusting the sample results based on the CCV's does not change the conclusions with respect to the applicable standard. The sample results are usable.
10. The CCV's for selenium analyzed on February 26, 1987 were below the lower acceptance limit of 90%. The CCV's were 78% and 83%. All the sample results were less than the detection limit of 2 ppb. The applicable standard for selenium is 10 ppb (State of Illinois Public and Food Processing Water Supply Standards). Adjusting the sample results based on the CCV's does not change the conclusions drawn from the data relative to the applicable standard. Accordingly, the data are usable.

11. Iron analyses were conducted on February 19, 1987 with no preparation blank analyzed. The sample preparation step consisted of filtration. The sample results indicate that ten of the twelve samples are below or just above the detection limit of 10 ppb. The sample results appear to be in control. The conclusions drawn from the data do not change due to the lack of preparation blank.
12. One of the spike samples for lead analyzed on February 27, 1987 was below the lower acceptance limit of 85%. The spike recovery was 69.5%. Three sample results are associated with this spike. One sample result was less than detectable, one was at the detection limit (5 ppb) and one was just above the detection limit (6 ppb). The applicable standard for lead is 50 ppb. The sample results are an order of magnitude less than the standard. The conclusions drawn from the data do not change upon consideration of the unacceptable spike recovery. The data are usable.
13. The spike sample recoveries for antimony analyzed on March 2, 1987 were below the lower acceptance level of 85%. The spike recoveries were 81.2% and 79.6%. All the sample results were less than the detection limit of 20 ppb. There is no state or federal standard for antimony. The conclusions drawn from the data do not change even though the spike recoveries were lower than the acceptable range. The data are usable.
14. The spike sample recovery for arsenic analyzed on February 24, 1987 was 117% which is just above the acceptance limit of 115%. Three sample results are associated with this spike. Two are less than the detection limit of 5 ppb and one (77 ppb) is greater than the applicable standard of 50 ppb. The conclusions based on the data do not change upon consideration of the spike recovery. Accordingly, the data are usable.
15. The spike recovery for cadmium analyzed on March 6, 1987 was 78.4%, which is below the lower acceptance limit of 85%. Two of the five sample results associated with this spike recovery were an order of magnitude less than the applicable standard for cadmium of 10 ppb. The other three were above the applicable standard. The conclusions drawn from these data do not change upon consideration of the spike sample. The data are usable.
16. The spike recovery for copper analyzed on March 4, 1987 was 117%, which was just above the upper limit of 115%. All the sample results associated with this spike sample were less than the detection limit of 10 ppb. The conclusions drawn from the data do not change upon consideration of the elevated spike recovery. The data are usable.

17. Two spike sample recoveries for mercury analyzed on February 23, 1987 were just outside the acceptable range of $100\% \pm 15\%$. The spike recoveries were 83% and 120%. The sample results for these spike recoveries were all less than the detection limit of 0.5 ppb. The conclusions drawn from the data do not change upon consideration of the spike recoveries, and the data are usable.
18. A spike sample recovery for selenium analyzed on February 26, 1987 was below the lower acceptance limit of 85%. The spike recovery was 69%. The sample results for selenium were all less than the detection level of 5 ppb, which is compared to the applicable standard of 10 ppb. The conclusions drawn from the data do not change upon consideration of the spike sample recovery. The data are usable.
19. The spike sample recoveries for silver analyzed on March 5, 1987 were 81% and 75%, which were below the lower acceptance limit of 85%. All the sample results associated with these spikes were less than the detection limit of 5 ppb. The state standard for silver is 5 ppb (State of Illinois General Use Water Quality Standards). The federal primary drinking water standard for silver is 50 ppb. Conclusions based on the federal primary drinking water standard are not changed upon consideration of the spike recoveries. The data are usable.
20. No LCS for iron was analyzed on February 19, 1987. The LCS would have provided information relative to the accuracy of the results. The internal QC results are all well within acceptable ranges. Ten of the twelve sample results are below or just above the detection limit of 10 ppb. The applicable standard for iron is 300 ppb. The other two sample results are well above the applicable standard. Considering that all the internal QC for iron is excellent and the sample results are either at or below the detection limit, or well above the applicable standard, the lack of a LCS does not change the conclusions drawn from the data. The data are usable.
21. Raw data for total dissolved solids and sulfate analyses were included with the QAPP data package. However, the laboratory work sheets were inadvertently left out of the data package. The laboratory work sheets for these analyses are attached. The QA/QC data for the sulfate analyses indicate that the QA/QC objectives were met for sulfate. QA/QC analyses for total dissolved solids were not reported. It should be noted that total dissolved solids were analyzed as an indicator parameter only.

In summary, all the ground water data are usable, although several discrepancies in meeting the QA/QC objectives were identified. The data are of sufficient quality to meet the overall objectives for their use in this project.

Mr. Stephen W. Holt
September 16, 1987
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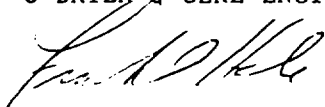
Summary

Data generated during the NL Granite City RI have been subjected to a review relative to the QA/QC objectives outlined in the QAPP and the overall objectives of the project. The data reviewed include the analytical results for the slag pile, soil, first round ground water samples. In most cases the data attained the QA/QC objectives. In those instances where discrepancies between the QA/QC sample results and QA/QC objectives were identified, the data were evaluated relative to the overall objectives for the project. The review indicated that the quality of all the data generated was sufficient to render the data usable in terms of the overall objectives of the project.

If you have any questions regarding this matter, please contact me at (315) 451-4700.

Very truly yours,

O'BRIEN & GERE ENGINEERS, INC.



Frank D. Hale
Research Manager

FDH:dn/27:25

cc: Mr. D. M. Crawford
Mr. D. R. Hill
Dr. C. B. Murphy, Jr.

Analy Code	Store No	Repeats	Sample Number	Parameter Name	Sample Size	Replicate No. 1					Replicate No. 2				
						W1 Tare Weight	W2 103 Deg. Weight	W3-W1 550 Deg. Weight	Sample Size	Tare Weight	103 Deg. Weight	550 Deg. Weight			
003			D38575C4		1100	18.4657	18.5280	.0623	255						
			DUP D3857			17.181	17.2440	.0623	255						
			D3858			18.150	18.1569	.0069	28						
			DUP D3858			15.6818	15.6881	.0063	26						
			D3758			17.0966	-								
			D3759			18.0372	-								
			A7901			19.11281	-								
			D3900			16.1658	-								
			D3902			18.3327	18.4221	.0894	121						
			D3904			18.2686	18.3192	.0506	207						
			D3906			18.2323	18.2607	.0284	116						
			D3908			18.0681	18.1465	.0784	317						
			D3910			19.5114	19.5460	.0346	142						
			D3912			17.9861	18.0575	.0714	293						
			D3914			17.9789	18.0184	.0395	162						
			D3916			18.2210	18.2843	.0633	260						
			D3918			16.2903	16.4218	.1315	553						
			D3920	BLANK		18.3289	18.3292		11						
			D3922			16.1178	16.1179								
			D3920	BLANK		18.1139	18.1140								
			D3920	SOX D3858		16.2269	16.2353	.0084	24						
			D3920	STO D3858		18.6067	18.6315	.0248	102						
			D3920	SP2 D3858		16.9211	16.9212								
			D3920			15.9272	15.9273								

$$mg/L SO_4 = (W_2 - W_1) \times \frac{1000}{ml \text{ of sample}} \times 0.41 \times 1000$$

SO₄
Solids

Analysis Update

Date 2/10/97
By EMG

Analy Code	Store	Repts	Filtered	Sample Number	Parameter Name	Replicate No. 1					Replicate No. 2				
						Sample Size	Tare Weight	103 Deg. Weight	ΔW Weight	X DL. Factor = Sample Size	Tare Weight	103 Deg. Weight	550 Deg. Weight		
003				A7901	504	100	15.7271	15.7277	.0006	X1	2				
				A8203		100	18.0712	18.0738	.0022	X1	9				
				A7727		100	18.2177	18.2183	.0005	X1	2				
				A8234		100	15.9223	15.9281	.0058	X1	24				
				A8205		100	17.9864	17.9868	.0004	X1	2				
				D3900		200	16.2874	16.2948	.0074	X5	152	150			
				D3920		100	18.3273	18.3579	.0306	X10	1254	1250			
				D3922		100	18.4010	18.4390	.0380	X10	1558	1560			
				D3756		200	18.2692	18.2716	.0044	X5	90	90			
				D3757		100	18.3903	18.3980	.0077	X10	316	320			
				D3758		200	16.5097	16.5132	.0045	X5	92	90			
				D3759		100	18.1493	18.2349	.0856	X10	3510	3510			
				D3969		100	18.0676	18.0792	.0116	X1	48				
				A8472	DL PD3965	100	16.5270	16.5387	.0117	X1	48				
				A8473	PK PD3969	90	16.5382	16.5508	.0126	X1	51.6	52			
				D2576		50	16.2509	16.2719	.0210	X2	172	172			
				D2577		60	18.4659	18.4764	.0105	X1.5	65				
				D2578		29	17.1820	17.1979	.0159	X3.4	224				
				D2579		50	15.5178	15.5234	.0056	X2	46				
				D2778		50	17.9917	18.0144	.0227	X2	186				
				A8474	BLANK		14.7527	14.1528	.0001		<1	102			
				5TD			17.7006	17.7250	.0244		100				
				D2579		50	16.7717	16.7855	.0068	X2	55				



Laboratory Analysis Coding Form

Analysis Update

Date 2/13/87

By RMG

[illegible]